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ABSTRACT

The changing nature of institutional research due to the expanded use and capabilities of information technology was explored through a regional survey of institutional researchers, who indicated their involvement in information systems development. Results were analyzed for all respondents, by type of institution (four-year versus two-year), and by whether a formal institutional research office existed. Survey results revealed a changing role for institutional research. Involvement in the design of an institution's management information system and helping other offices apply and utilize information technology were displacing the traditional preparation of reports role associated with institutional research. Information management and resource allocation analysis were most often the functions added to or gaining priority. A change in position to which the office reports was associated with a change in the number of employees in the office, and the perceived change in status of the office. Changes in the office's budget and number of employees were associated with several factors, including increased computer resources. The relationship between the changing role of institutional research and the administration of higher education in general was also reviewed. (SW)

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The Transformation of Institutional Research As a Result of Improving Information Technology

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THE ASSOCIATION FOR INSTITUTIONAL RESEARCH

This paper was presented at the Twenty-Fourth Annual Forum of the Association for Institutional Research held at the Hyatt-Regency in Fort Worth, Texas, May 6-9, 1984. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum papers.

Daniel R. Coleman, Chairman
Forum Publication
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THE TRANSFORMATION OF INSTITUTIONAL RESEARCH AS A RESULT OF IMPROVING INFORMATION TECHNOLOGY

ABSTRACT

This paper offers an empirical probe of the perceived changing nature of institutional research due to the expanded use and capabilities of information technology. The results of a regional survey of institutional researchers on their respective involvement in information systems development is presented. The results of the survey reveal a changing role for institutional research. Involvement in the design of the institution's management information system and helping other offices apply and utilize information technology are displacing the traditional preparation of reports role associated with institutional research. The relationship between this change and the administration of higher education in general is also reviewed.

THE TRANSFORMATION OF INSTITUTIONAL RESEARCH AS A RESULT OF IMPROVING INFORMATION TECHNOLOGY

INTRODUCTION

This paper offers an empirical probe of the perceived changing nature of institutional research. The Denver and Toronto Forums of the Association for Institutional Research both addressed this issue in its political and technological components respectively. Here we focus on the implications of improving computerized information systems on the role of institutional research.

General economic conditions and changing demographic patterns have increasingly restricted the options available for managers of higher education. The management of growth has been displaced by an emphasis on resource allocation and preservation of past gains. In such an environment, the information needs of management become critical. Keller(1983,p.131) cites an effective management information system as a precondition for the strategic planning needed for the future prosperity of higher education. It would appear to follow that this need would translate into greater demand for the services of institutional research. However, for numerous reasons, this may not be the case for particular institutions.

Advances in computer software and hardware have created the opportunity for managers to bypass institutional research in obtaining needed information. At the same time, financial constraints have reduced the ability to expand data processing

services and thus, have provided a strong incentive for users to do their own data processing. As a result, individual offices and managers will have the capability and knowledge to obtain needed information directly.

These varied forces suggest a shift in the role of institutional research away from providing information and toward facilitating the development of needed computerized information systems. This might include an expanded role in information system design and development. We see institutional research as a possible bridge by which the concept and implementation of an information center is introduced into higher education.

BACKGROUND

The hypothesis above is based on trends reported in the literature on information systems, cases reported from other institutions, and the experience of our own institutional research office. The key question raised is how widespread is this change? The degree and depth of this change has significant implications for the nature of our profession, especially for the training and background required for the practice of institutional research.

The emergence of microcomputers, fourth generation software, and information centers has become a central topic in the literature on data processing and information systems. James Martin (1982) has probably become the single most influential advocate of these technological and management improvements.

His work has been especially critical in identifying the increased role and responsibility of end-users. The growing use of distributed systems, office automation, graphics, and telecommunications will only accelerate the rapidly changing nature of information management. Updegrove(1981) and Mann(1982) have addressed these issues in the context of higher education in general and institutional research in particular.

A critical theme in this literature has been the creation of information centers to serve as a mechanism for helping end-users take advantage of technological improvements. Sholtys (1983), Lolli (1983), Teeter (1983), and Stevenson and Walleri (1983), have described the role of institutional research in performing information center functions at particular institutions.

METHODOLOGY

In an effort to validate and describe this perceived change in the nature of institutional research, a regional survey was initiated. The survey population is based on a mailing list provided by the Pacific Northwest Association for Institutional Research and Planning (PNAIRP), which includes both member and non-member institutions in British Columbia, Canada; Washington; Alaska; Idaho; and Oregon.

The survey instrument attempts to measure the degree to which institutional researchers have become involved in the application and dissemination of computer tools within their respective institutions, with three basic topics covered.[1]

The first part of the survey solicits respondent and institutional characteristics including position, institutional type (two-year,four-year, or other), and the existence of a formally recognized Office of Institutional Research.

The second part of the survey probes for changes in the nature of the office (whether it be institutional research or other,i.e., Registrar), using Fall 1980 as a benchmark. These questions are as follows:

-has the inflation-adjusted budget for your office changed significantly?

-have the number of employes in your office changed significantly?

-have the computer resources available to your office changed significantly?

-has the institutional status of your office changed significantly?

-what functions or activities of your office have been added?, gained priority?, lost priority?, or been deleted?

-has your office been involved in designing your organization's computerized information system?

-has your office been involved in helping other campus offices develop their information systems or better utilize their computer resources?

The third part of the survey asked if the respondent's institution had moved toward more computer access for campus offices, greater use of microcomputers in administration,

creation of an information center to help end-users optimize available computer resources, office automation with electronic mail, distributed systems with networking, graphics hardware and software, and other (telecommunications, etc). Respondents were also asked if they thought these institutional movements would significantly influence the role of their office.

The questions were phrased in "yes" or "no" response format with narrative explanation encouraged for affirmative responses.

The survey was conducted by mail during the Fall of 1983 with a second mailing to all non-respondents. Of the 112 institutions identified, there were 79 valid questionnaires returned for a 71% response rate.

RESULTS

The positions of those completing this survey were varied. Ten of 79 respondents had titles of Dean or Vice President. Twenty were titled Director of Institutional Research while thirty-three had "Research" as part of their title. Nine had "Planning" in their title, eight had "Information", six had "Systems", and nine had "Registrar" in their title.

The type of institution responding was evenly split between two-year (35) and four-year (35) institutions. Nine institutions were state, province, or private organizations involved in researching and/or coordinating education.

An Office of Institutional Research existed in 69% (24 of 35) of the four-year schools and in 46% (16 of 35) of the

two-year schools. Twenty-nine of these schools did not have a specific Office of Institutional Research where 23 of these 29 described how the function was being handled. Ten of the 23 without Institutional Research offices indicated that this function is part of their responsibilities along with others such as registration, planning, business office, administrative computing, or provost/vice president's office. Six schools indicated that institutional research is a shared responsibility between specific offices. Three schools stated that the function had been lost "in the financial crunch". Interestingly, one school is now recruiting for a just created institutional research position and three schools stated a need exists.

Twenty-seven of 79 respondents stated that there has been a change since the Fall of 1980 in the position to which their office reported with 12, 11, and 4 from four-year, two-year, and other institutions. An analysis of the brief descriptions of these changes indicated five shifts to a lower office, six shifts to similar level office, and seven shifts to a higher office. These respondents were about evenly split between reporting to the President, CEO, Provost, or Chancellor (25); reporting to a Vice President (23); or reporting to a Dean, Bursar, or Director (28).

When asked about other changes since the Fall of 1980, the following responses were obtained for the total group (for four-year, two-year, and other institutions):

23 yes (7,13,3) their office's inflation-adjusted budget changed significantly;

29 yes (10,15,4) their office's number of employees changed significantly;

53 yes (24,25,4) the computer resources available to their office changed significantly; and

26 yes (9,14,3) the institutional status of their office changed significantly.

An analysis of described budget changes indicates twelve decreased from 12% to 50% and four increased their budget to accomodate additional responsibilities such as; "development of a physical master plan" and "an added staff person for information systems". Comments indicated that significant staff reductions have outstripped the gains at a few institutions.

The comments regarding changes in computer resources were varied and very positive. Access to new or improved minicomputers or to their office's own microcomputer was a dominant theme. The direction being pursued by many offices is reflected in the following verbatim comment:

-"a computer terminal will be available within a few weeks which will be hard wired into the administrative mainframe, downloading capabilities will be available, eventually, with a 20 megabyte hard disc drive."

Respondent comments indicate positive changes in the status of their offices. The following are comments which relate information processing changes to changes in status, stature, or respect:

-"a terminal and SPSS has brought about an increase in demand for services and probably an increase in the stature of the office within the college system."

-"More interest is being shown in data-based decision making."

-"Development of a campus-wide management information reporting system has heightened visibility."

Other comments indicated that increased planning responsibilities and increased work within resource allocation has also led to improved status.

Another way of examining changes is to analyze "which functions and activities of your office have been added, gained priority, lost priority, or been deleted". The following are examples of responses under each category: BEEN ADDED... "Facilities planning"; "Word processing"; "Five year data base management plan"; "Computer information"; "Information Center"; "Campus DSS planning"; "Creating and updating management information resource manuals (MIRM)"; "Faculty productivity"; "Planning self-study"; "Budget modeling"; "Personnel reporting system"; "Computerized registration, Program evaluation"; and "Marketing studies". GAINED PRIORITY..."Management information development"; "Faculty resource allocation planning"; "Budget analysis"; "Improved information systems"; "College computer planning"; "Information systems type activities"; "Accreditation"; "Ad hoc report generation"; "Market research"; and "More emphasis on micro computers for report generation." LOST PRIORITY..."Facility inventory"; "Learning assessment";

"Achievement test development"; "Publication of routine data products"; "Specialized program evaluations"; "Fact books"; "Reporting to outside agencies"; "System-wide student-based studies"; and "Committee appointments". BEEN DELETED... "Computerized reports when new system is functional"; "Fact Book"; "Direct involvement in system level planning"; "Setups of student information system runs"; "Parts of federal/state reporting"; "Student information system coordination"; "Fiscal reporting"; and "Enrollment forecasting". While these are only examples of responses, a movement toward data base and information system planning and activities can clearly be seen.

In order to further examine this hypothesized movement, offices were asked if they were "involved in designing their organization's computerized information system" and if they were "involved in helping other campus offices develop their information systems or better utilize their computer resources". Of the 79 respondents, 43 (18-four year, 21-two year, and 4-other institutions) were involved in design while 37 (14-four year, 19-two year, and 4-other institutions) helped other campus offices move toward computerized information systems. While there were many, detailed comments regarding these office activities, the following comments from "NO" respondents give a feel for the strength of this movement:

-"Unfortunately, no. That is why an office has been established. We've run into problems with our information/computer system and realize such an office is necessary."

-"Have been presenting proposal for same (involvement in system design).

The following are comments from "YES" respondents to these two questions:

-"Deeply involved in design and implementation of MIS system"

-"Institutional research has primary responsibility for coordinating the introduction and maintenance of a new student information system."

-"Maybe designing is not the right word. There are many problems in the data base management system and my office is involved in instituting procedures to overcome some of these problems."

-"I am chairman of local MIS committee."

-"One staff serves as user consultant to others on Micros."

-"We are a resource to offices seeking ideas on how better to use the system."

While institutional research is playing a growing role, how are these institutions presently moving with or without institutional research? The following results show significant movement toward:

-"more computer access for campus offices" yes-71,no- 5

-"greater use of micros for administration" yes-56,no-17

-"graphics hardware and software" yes-40,no-33

-"office automation with electronic mail" yes-31,no-39

-"creation of an information center to help end-users optimize computer resources" yes-30,no-36

-"distributed systems with networking" yes-22,no-44

-"other (telecommunications, etc.)" yes-22,no-32

Four year schools had more "graphics hardware and software" while two year schools had more responses for office automation and information centers. Most of the non-four, non-two year organizations are utilizing microcomputers and office automation with electronic mail.

The survey's last question highlights the issue this paper is addressing..."Do you think your institution's movements in these directions will significantly influence the role of your office?" While 42 of 79 responded "YES" (17-four year, 20-two year, and 5-other), sample "NO" responses included: "has already influenced our work", "these tasks will soon be taken over by a micro-support office", and "informally we will help". Sample "YES" responses included:

-"Hopefully, it will result in this office establishing or assisting in the establishment of mandatory and uniform data definitions which each unit must use, thereby resulting in better data for this office which will increase the ability of the office to conduct institutional research."

-"My office becomes more and more the Information Center ... interpreter of computer resources, and teacher of the uninitiated."

-"Eventually we will be more involved with assisting offices in the use of electronic (as opposed to printed) information for administration."

-"I expect this office to place greater emphasis on the use of microcomputers and the support function for other offices. I also expect we will be using electronic mail, graphics, and greater networking in the near future."

-"Institutional research will play a vital role in integrating a multi-user system."

-"At the moment it has defined the role of this office. In the future I think the reverse will be true -- this office will influence and define the role of our computer resources. We will be better able to disseminate information efficiently using new computer resources and the higher computer literacy across campus."

-"However, it is not yet possible to assess the scope and/or magnitude of the influence on institutional research."

These verbatim comments show that for some the improving information technology is causing a transformation of institutional research!

ANALYSIS

Analysis of the data involved several steps. As an initial step, Pearson product moment correlations were generated for all possible variable pairs. Those variable pairs with a .05 significance level or less were identified for further analysis. Crosstabulations were run for all identified pairs with the chi-square and phi or Cramer's V examined. Again, a significant

level of .05 was used as a general guide in identifying associations to report. Thus, this section provides a summary of the above described statistical analysis.

Results are reported for all respondents, by type of institution (four-year versus two-year), and by whether or not a formal office of institutional research existed. The results were also broken down by type of institution and the existence of an institutional research office (i.e., four-year and research office, two-year and no research office, etc.). For these latter categories, however, the sample became too small for statistical validity. The results for all respondents as a whole are reported first.

In terms of the different aspects of information technology identified in the survey, only the institutional movement toward graphics is associated with the existence of a formal office of institutional research, and this is so only for four-year institutions.

A change since Fall 1980 in position to which the office reports is associated with change in number of employees in the office, and the perceived change in status of the office. Change in position to which the office reports usually involved a higher level (i.e., vice-president, president).

A significant change in the office's budget since Fall 1980 is associated with a change in number of employees, increase in computer resources for the office, perceived change in status, and expected change in role of office due to institutional movement toward greater use of information technology.

Change in the number of employees is associated with increased computer resources, perceived change in institutional status of the office, helping other offices develop information systems or better utilize computer resources, and expected role change for the office.

An increase in computer resources for the office is associated with involvement in design of the institution's information system.

Perceived change in the institutional status of the office is associated with an expected change in role of office.

For the various aspects of information technology listed, helping other offices is correlated with institutional movement toward other computer uses (i.e., telecommunications, etc.). Institutional movement toward greater computer access is related to movement toward graphics; office automation is related to distributed systems, which in turn is associated with movement toward graphics. Three of the seven listed aspects of information technology are related to perceived change in role of the office: the establishment of an information center, office automation, and distributed systems.

The results clearly demonstrate the increasing reliance on information technology of both institutions and offices involved with or wholly dedicated to institutional research. Most of the respondents see these changes as impacting the future role of their office. In terms of functions added to or gaining priority, information management and resource allocation analysis were listed the most often. Of course, greater

involvement in information management does represent a logical extension for institutional research, since practitioners have experience in the transformation of data into information. Further, few others in an institution would have the data-base perspective derived from institutional research.

Two key variables in terms of the number and strength of correlations with other variables is change in office budget or number of employees. Both of these variables were recoded for direction (increase or decrease) with another run of crosstabulations. The results indicate that direction of change is not as important as change itself. That is, the number of significant correlations was less especially with variables dealing with information technology. An increase in budget is associated with type of institution in that two-year institutions have experienced more change (both up and down). This variable is also related to perceived change in the role of the office.

The overall results by type of institution tend to follow the general pattern described above, although the four- and two-year institutions do tend to exhibit different patterns. For example, only the four-year institutions show an association between increase in office computer resources and change in number of office employees; and between change in salaries and change in position to which the office reports. Only at the four-year institutions is the existence of a formal office of institutional research related to helping other offices apply information technology. Also for these institutions, greater

computer access is associated with greater use of microcomputers Finally and only for the four-year colleges and universities, perceived change in role of office due to greater institutional commitment to information technology is associated with change in position to which the office reports, change in status, greater use of microcomputers, development of an information center, and office automation.

For two-year colleges, change in number of office employees is associated with change in position which the office reports and change in budget. Increase in office computer resources is also associated with an increase in office budget. Helping other offices apply information technology is related to change in position to which the office reports and change in number of office employees (regardless of direction). Thus, although the sample is evenly split between four and two-year institutions, the two-year colleges show a markedly different pattern from the four-year colleges. It appears that a specific information technology related change at two-year colleges is less systematic or interrelated to other changes than at the four-year institutions. This is so even though the two-year colleges reported more change as a group than the four-year institutions.

Whether or not a formal office of institutional research exists does not appear to significantly change the above patterns. That is, institutions that locate the institutional research function in one or more other offices do not exhibit a markedly different pattern in terms of information technology

from those institutions with a formal office of institutional research.

IMPLICATIONS

Underlying the revolution in administrative roles in higher education is the evolution of information technology. For decision-making to be information based, the information must be immediate, relevant, and accurate. To aspire to this type of management information system, most institutions have had to upgrade if not totally replace their information technology. To achieve and maintain true decision support systems will require a continuous and long-term commitment.

As the survey results indicate for institutional research, the movement of information technology away from centralized data processing departments and into administrative offices inevitably transforms both the roles of the offices and individuals within those offices. If managers can send memos to one another electronically using their own terminals, what implications will this have for secretaries for whom such correspondence was a significant part of their job? If managers can derive needed information directly from the same terminal with reporting and graphics capabilities, what are the implications for institutional researchers whose responsibility it was to rountinely prepare such reports?

The extent of the transformation to come from improving information technology, however, goes beyond individual offices and their personnel. The same technology is initiating a

reorganization and integration of office functions within a decentralized framework. Budgeting, scheduling of classes, and even student registration can be shifted from centralized offices to the department level.

Because of the resources involved and the natural resistence to change from individuals affected, the potential transformation inherent in information technology cannot be realized without commitment and leadership from the highest administrative levels. The results of the survey reported here and other studies referenced indicate that this leadership and resolve has been forthcoming. Although institutional research may and can act as a catalyst in this process, it is just as likely that the trends documented are simply a result of being swepted up by the same current of change affecting other offices.

What will be the role of institutional research within this transformation? The survey results reported here indicate some of the possible directions. Involvement in the design of the institution's management information system, and helping other offices apply the information technology are but a few examples. An important question that can be raised about these results is what distinguishes institutional research from data processing? That is, will institutional research remain a distinct profession or be subsumed within the general framework of administrative computer services? There are sevesal factors which are likely to preserve the unique role of institutional research. First, institutional researchers bring a substantive

knowledge and understanding of higher education to bear that most individuals in data processing lack. Second, institutional researchers also offer the methodology and research skills needed to apply analysis to data and thus produce information. It is our opinion that these skills will continue to be needed even though they will be exercised within a revised environment.

NOTES

1. The contents of the questionnaire are only reviewed here. A copy of the complete questionnairs and other details of the survey can be obtained from the authors.

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